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Synthesis, characterization and thermoresponsive behavior of hydrophobically modified poly(2-ethyl-2-oxazoline)s

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Poly(2-alkyl-2-oxazoline)s belong to a synthetic class of unique polyamides with pendant amide groups. These polymers can be prepared by quasi-living cationic ring-opening polymerization (CROP) of 2-alkyl-2-oxazoline monomers. This highlighted group of macromolecules is of great interest for biomedical applications due to their biocompatibility and biodegradability. Poly(2-ethyl-2-oxazoline)s (PEtOx) possesses thermoresponsive behavior and critical solution temperature (CST) in water. This phenomenon can be tuned by the structure of the polymer by either with the variation of the 2-substituent or applying end-group modifications. For accurate control of the hydrophilic-hydrophobic balance of the macromolecule, quasi-living CROP of 2-alkyl-2-oxazolines gives an excellent opportunity with the broad selection possibility of initiators and terminating (quenching) agents. In our work, thermoresponsive poly(2-ethyl-2-oxazoline)s were prepared by quasi-living CROP with different average molecular weights. Several initiators and terminating agents were used in order to result in monofunctional and bifunctional, hydrophobically modified, amphiphilic type macromolecules. The hydrophilic-hydrophobic balance of these polyoxazolines can be controlled by the choice of the initiator, terminating agent and the molecular weight. The thermoresponsive behavior of the synthesized products was comprehensively studied by turbidimetry in a wide concentration range. A strong influence on the CST values was determined as a function of the chain length and presence of alkyl end-groups.

Biography

Balázs Pásztói started his PhD in 2015 at the Eötvös Loránd University in Budapest, Hungary. He currently works as a research assistant at the Polymer Chemistry Research Group of RCNS HAS. His research topic involves mainly the synthesis of functional polyisobutylenes and the investigation of the thermoresponsive behavior of polyoxazolines.

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